What is claimed is:

1. A folded antenna comprising:

a ground plate; and

an antenna element having a plurality of turning parts and a plurality of segments formed between the turning parts, the segments being formed by being turned back in zigzag in parallel to one face of the ground plate at the turning parts, while the antenna element extending perpendicularly to the one face of the ground plate,

wherein a length of one segment or a length of a set of segments, which is a pair of arbitrary two adjacent segments having the same length, is shorter on a side of the one face of the ground plate and increases gradually as the segment or the set of segments is away from the one face of the ground plate, and

wherein the antenna element is formed such that the folded antenna resonates at two or more frequency bands and has a fractional bandwidth of 4% or more of a frequency in a first frequency band and a fractional bandwidth of 15% or more of a frequency in a second frequency band, by adjusting lengths of the segments or sets of segments having the same length, and intervals between adjacent segments.

2. The folded antenna according to claim 1, wherein three or more segments are formed such that at least two of intervals between two adjacent segments among the segments are different.

3. The folded antenna according to claim 1 or 2, wherein the first frequency band is from 2.4 to 2.5 GHz and the second frequency band is from 5 to 6 GHz.

4. The folded antenna according to claim 1, 2 or 3, further comprising:

a dielectric base, on a dielectric face, that is, a surface or an inside face of which the antenna element is formed by a conductor film;

a ground conductor film to be connected to ground as the one face of the ground plate, the ground conductor film being provided on a side surface of the dielectric base which is perpendicular to the dielectric face; and

an end part of the antenna element which is provided on the side surface so as not to contact to the ground conductor film;

wherein the antenna element is extended in a direction perpendicular to the side surface from the end part on the dielectric face, and then turned so as to be in parallel to one side which is a cross line of the side surface and the dielectric face, and this construction is repeated such that a plurality of turning parts are formed in a direction away from the side surface.

5. The folded antenna according to claim 4, wherein a distance between a first segment, which is nearest the ground conductor film among segments parallel to the one side, and the ground conductor film is from 0.8 to 1 mm, a length of the first segment is from 4 to 4.5 mm,

the lengths of the segments are set so as to increase gradually as the segments are away from the ground conductor film, by a ratio from 1.05 to 2, which is a ratio of the length of adjacent segments or adjacent a segment and a set of segments parallel to the one side surface.

6. The folded antenna according to one of claims 1 to 5, wherein the turning parts are formed so as to spread symmetrically at a same angle for both sides of the center line which is defined as an extension of the end part of the antenna element perpendicularly to the one face of the ground plate, or the turning parts of one side are formed on the center line or a line apart from the center line by a certain distance and parallel to it and the turning parts of another side are formed to spread to only one direction as to the center line, in order.

7. The folded antenna according to one of claims 4 to 6, wherein the turning parts are bended obliquely.

8. The folded antenna according to one of claims 4 to 7, wherein the ground conductor film is formed so as to extend to the dielectric face of the dielectric base.

9. The folded antenna according to claim 1, wherein two or more segments are formed such that at least two of widths of the segments among the segments are different.

10. The folded antenna according to claim 4, wherein the dielectric base is stuck on a back face of a circuit board, on a surface of which a transmitting and receiving circuit is formed, and on the back face of which

a metal film is provided surroundings the dielectric base and a part of a feeding line to be connected to the end part of the antenna element, and the metal film and the ground conductor film are electrically connected.

11. A folded antenna comprising:

a dielectric base;

a ground conductor film which is provided on at least a part of one surface of the dielectric base as a ground plate; and

an antenna element having a plurality of turning parts and a plurality of segments formed between the turning parts, the segments being formed by being turned back in zigzag in parallel to an end face of the ground conductor film at the turning parts, while the antenna element extending perpendicularly to the end face of the ground conductor film,

wherein a length of one segment or a length of a set of segments, which is a pair of arbitrary two adjacent segments having the same length, is shorter on a side of the ground conductor film and increase gradually as the segment or the set of segments is away from the ground conductor film, and

wherein the antenna element is formed such that the folded antenna resonates at two or more frequency bands and has a fractional bandwidth of 4% or more of a frequency in a first frequency band and a fractional bandwidth of 15% or more of a frequency in a second frequency band, by

adjusting lengths of the segments or sets of segments having the same length, and intervals between adjacent segments.

12. The folded antenna according to claim 11, wherein the dielectric base is provided on a part of a back face of a circuit board, on a surface of which a transmitting and receiving circuit is formed, and on the back face of which a metal film is provided surroundings the antenna element and a part of a feeding line to be connected to the end part of the antenna element, and the metal film and the ground conductor film are electrically connected.